

WHAT IS CLAIMED IS

1. A data distribution system comprising:
  - a data distribution server for supplying data to a user side;
  - at least one access server provided on the user side and transferring intended data to each user; and
  - a network cache apparatus provided in a network wherein said data is distributed between said data distribution server and said access server and having a cache function unit for temporarily storing said data from said data distribution server and an exchange function unit for routing the stored data to said access server corresponding to a destination user.
2. A data distribution system as set forth in claim 1, wherein both said data distribution server and network cache apparatus and both said network cache apparatus and access server are connected via an optical cross-connect equipment or label switch forming said exchange function unit of the network cache equipment.
3. A data distribution system as set forth in claim 1, wherein both said data distribution server and network cache apparatus and both said network cache apparatus and access server are connected via an optical cross-connect equipment forming said exchange function unit of the network cache equipment and said data is distributed by wavelength multiplex transmission.
4. A data distribution system as set forth in claim 1, wherein, where there is only one network cache apparatus in said network,
  - said data distribution server is provided with a data transmitting unit for generating a packet for transmitting said data and adding a cache specifying address for specifying said network cache apparatus as a destination of transmission to the packet, and
  - said network cache apparatus is provided with a routing unit for adding a distribution address for

setting said access server to which said packet is to be distributed from the destination information contained in said packet to the packet when detecting said cache specifying address directed to itself and transmitting this to said access server side and thereby performs the distribution of said data.

5. A data distribution system as set forth in claim 1, wherein, where there are a plurality of said network cache apparatuses inside said network,

said data distribution server is provided with a data transmitting unit for generating the packet for transmitting said data and adding a cache-specifying multi-cast address for specifying a plurality of said network cache apparatuses as the destination of transmission to the packet, and

each said network cache apparatus further distributes said packet to said network cache apparatus of the next stage based on the cache-specifying multi-address when detecting said cache-specifying multi-address containing the address of itself and each network cache apparatus is provided with a routing unit for adding a distribution address for setting said access server to which said packet is to be distributed from the destination information contained in said packet to the packet and transmitting this to said access server side and thereby performs the distribution of said data.

6. A data distribution system as set forth in claim 1, wherein said data distribution server is provided with a first congestion monitor indicating unit for transmitting a first inquiry request command to the network cache apparatus and inquiring about the congestion state thereof when said data must be transmitted to said network cache apparatus, and

said network cache apparatus is provided with a first congestion monitor responding unit for receiving said first inquiry request command, inquiring about the congestion state thereof, and returning the

result to said congestion monitor indicating unit as a first inquiry response, and

said data distribution server transmits said data when said first inquiry response indicates "no congestion".

7. A data distribution system as set forth in claim 1, wherein said network cache apparatus is provided with a second congestion monitor indicating unit for transmitting a second inquiry request command to the access server and inquiring about the congestion state thereof when said data is received from said data distribution server and the data must be transmitted to said access server,

said access server is provided with a second congestion monitor responding unit for receiving said second inquiry request command, inquiring about the congestion state thereof, and returning the result as a second inquiry response to said second congestion monitor indicating unit, and.

said network cache apparatus transmits said data when said second inquiry response indicates "no congestion".

8. A data distribution server placed on outside of the network,

receiving the data from the outside, temporarily holding this, communicating with the network cache apparatus provided in said network for routing the held data to the user side, and distributing said data to a user outside said network.

9. A data distribution server as set forth in claim 8, wherein provision is made of a data transmitting unit for generating a packet for transmitting said data and adding a cache-specifying address for specifying said network cache apparatus as the destination of transmission to the packet and adding a cache-specifying multi-cast address for specifying a plurality of said network cache apparatuses as the destination of

transmission to the packet where there are a plurality of said network cache apparatuses in said network.

10. A data distribution server as set forth in claim 9, wherein said data transmitting unit is linked with a data access request receiving unit for accepting a send request of said data from a data provider or an access request of said data from the user and outputs information concerning at least a destination list of the destination of distribution of said data and a valid term of the distribution together with the related data from the data access request receiving unit.

11. A data distribution server as set forth in claim 9, wherein provision is further made of a data storage unit for storing said data and information output from said data access request receiving unit for a certain valid term and said stored data and information are transmitted from said data transmitting unit to said network cache apparatus according to a send instruction.

12. A data distribution server as set forth in claim 9, wherein a congestion monitor indicating unit for outputting said send instruction is provided, and the congestion monitor indicating unit transmits an inquiry request command with respect to the network cache apparatus to inquire about the congestion state thereof when said data and information are to be transmitted to said network cache apparatus.

13. A network cache apparatus comprising: a cache function unit linked with both a data distribution server for supplying data to the user side and at least one access server provided on the user side and transferring intended data to users for temporarily storing said data from said data distribution server, and an exchange function unit for routing the stored data to said access server corresponding to the destination user.

14. A network cache apparatus as set forth in claim 13, wherein said cache function unit has a congestion monitor responding unit for performing the inquiry in

response to the inquiry request of the congestion state from said data distribution server and returning the result to the data distribution server.

15. A network cache apparatus as set forth in claim 13, wherein said cache function unit has

a routing unit for receiving said data and information concerned with at least a distribution destination list of the data and a distribution valid term thereof from said data distribution server and controlling a distribution of the data to said access server corresponding to the user as the destination of the distribution via said exchange function unit and

a data storage unit for storing the data from said routing unit for the constant valid term.

16. A network cache apparatus as set forth in claim 15, wherein said routing unit creates a routing table listing a group of addresses of the distribution destinations based on said information and specifies said user as the destination of the distribution according to the routing table.

17. A network cache apparatus as set forth in claim 15, wherein said cache function unit has a congestion monitor indicating unit, and the congestion monitor indicating unit transmits an inquiry request command to the access server when said data is to be transmitted to said access server and confirms whether or not the inquiry response indicates "no congestion".

18. A network cache apparatus as set forth in claim 17, wherein said cache function unit has a data transmitting unit, and the data transmitting unit transfers said data stored in said data storage unit toward said exchange function unit when said inquiry response indicates "no congestion".

19. A network cache apparatus as set forth in claim 18, wherein

said routing unit creates the routing table listing the group of addresses of the destinations

of the distribution based on said information and specifies said user as the distribution destination according to the routing table,

said cache function unit has a data distributing unit, and

the data distributing unit transfers the data from said data transmitting unit to said exchange function unit toward said user as the destination of the distribution specified according to said routing table.

20. A network cache apparatus as set forth in claim 19, wherein

said cache function unit has a path setting request unit, and

the path setting request unit performs the route setting toward said user as the destination of distribution specified according to said routing table with respect to said exchange function unit.

21. A network cache apparatus as set forth in claim 20, wherein said path setting request unit selectively performs said route setting with respect to the access server for which said inquiry response indicates "no congestion" among a plurality of said access servers and prohibits the transfer of said data to be distributed to the access server from said data distributing unit with respect to an access server for which said inquiry response does not indicate "no congestion".

22. An access server placed outside of the network communicating with the network cache apparatus provided in said network for receiving the data from the outside and temporarily storing this and routing the stored data to the user side, fetching said data stored in the network cache apparatus, and distributing this to the user.

23. An access server as set forth in claim 22, wherein provision is made of a data access request unit linked to the data distribution server placed outside of said network and providing said data to be held by said

network cache apparatus and transmitting the access request to the data distribution server when there is an access request of the data from said user with respect to the data distribution server.

24. An access server as set forth in claim 23, wherein provision is made of a congestion monitor responding unit for performing a related inquiry in response to an inquiry request of the congestion state from said network cache apparatus and returning the result to the network cache apparatus as the inquiry response.

25. An access server as set forth in claim 24, wherein provision is made of a data receiving unit for receiving said data transmitted from said network cache apparatus when said inquiry response is "no congestion".

26. An access server as set forth in claim 25, wherein provision is made of a data storage unit for storing said data received at said data receiving unit for a certain valid term, a data transmitting unit for transferring the stored data toward said user side based on a send instruction from said data access request transmitting unit, and a data distributing unit for distributing transferred data corresponding to each user.

27. A data distribution system as set forth in claim 1, giving said cache function unit a duplex configuration, having each of an active cache function unit and a standby cache function unit constantly execute transfer of a monitor packet with said exchange function unit, and, when finding an abnormality in said active cache function unit monitored by the monitor packet, switching to said standby cache function unit to continue the distribution of said data.

28. A data distribution system as set forth in claim 1, wherein, when there are three or more network cache apparatuses inside said network, all network cache apparatuses are made able to set two or more transmission lines connected to two or more other network cache

20051003 031502

apparatuses, a failure monitor means for monitoring for failure of a transmission line is provided in said exchange function unit in each said network cache apparatus, and, when detecting the occurrence of said failure by the failure monitor means, the related failure transmission line is switched to another transmission line and the distribution of said data is continued.

1009933 03493  
20570 3366001